

Integrated Resources Evaluation Checklist

This water resources evaluation checklist is a starting point for water managers when planning and undertaking studies of watersheds and groundwater basins.

Some topics may not be relevant in some areas of the State. This checklist is intended to provoke thought about watersheds and not meant to be all inclusive. The topics are listed to allow water managers to decide whether to include them in their study or to exclude some, because some of those topics may not be necessary in that watershed and basin. Because of various political, institutional, legal and technical constraints in each watershed, the goals and contents of each study may vary.

The checklist begins on page 1. It is organized into six phases for ease in contracting with government agencies or private vendors to complete the work, and to allow management decisions as parts of the work are completed. In some cases it may be desirable to complete a reconnaissance level study that might include Phases 1, 2 and 5 before deciding to conduct a more detailed study.

At the end of any one of the phases you may decide to change the scope of the following phase before beginning the work, or you may decide to go no further with the project.

Water Facts are short reports on water resources issues of general interest. They are published periodically by the Department of Water Resources and can be obtained free by contacting DWR Bulletins & Reports, P.O. Box 942836, Sacramento, CA 94236-0001; 916/653-1097.

The six phases in the checklist are:

Phase 1—develop a plan

Phase 2—begin the study

Phase 3—select a model

Phase 4—evaluate the model continuously

Phase 5—select preferred water management alternatives

Phase 6—implement the program



Phase 1—develop goals & schedules and identify data availability

1. Goals of present study

- ☐ identify management goals

2. Existing documents

- ☐ general plan
- ☐ water management plans
 - ☐ urban
 - ☐ agricultural

3. Previous studies

- ☐ surface water
- ☐ groundwater
- ☐ water quality
- ☐ protection of recharge areas
- ☐ health
- ☐ sewage treatment
- ☐ waste water discharge
- ☐ solid waste disposal
- ☐ environmental projects
- ☐ wetlands
- ☐ habitat restoration
- ☐ desalination
- ☐ watershed studies

4. Data availability

- ☐ surface water supplies—local, imported, recycled
- ☐ groundwater levels & extraction
- ☐ interagency coordination
- ☐ precipitation
- ☐ water quality
- ☐ unit water use
- ☐ geology
- ☐ soil characteristics
- ☐ land use & ownership
- ☐ population
- ☐ habitat designation



Phase 2—begin the study

1. Political, institutional & legal issues

- ☐ water rights
- ☐ water management jurisdiction:
 - ☐ statutory or juridical authority
 - ☐ boundaries
- ☐ planning process
- ☐ staffing & funding

2. Local participation & consensus building

- ☐ identify stakeholders
- ☐ coordinate agency participation
- ☐ develop plan for continuous communication with stakeholders
- ☐ inform stakeholders of your objectives
- ☐ conduct informational workshops
- ☐ conduct local issues assessment
- ☐ establish local stakeholder advisory committee
- ☐ obtain public input
- ☐ build local consensus
- ☐ report progress to stakeholders & public

3. Water management plan (*local water*)

- ☐ water supply & demand
- ☐ water shortages
- ☐ water use efficiency
- ☐ conjunctive use
- ☐ plans for future Phase 2 & 3 activities

4. Regional water budget (*surface & groundwater*)

- ☐ basin boundaries
- ☐ precipitation
- ☐ surface water runoff
- ☐ surface water storage

- ☐ groundwater recharge—deep percolation, artificial, subsurface inflow, in lieu
- ☐ groundwater outflow—extraction, subsurface outflow
- ☐ evapotranspiration
- ☐ inflow - outflow = change in storage

5. Hydrogeology

- ☐ well inventory
 - ☐ drillers' logs (*construction information, lithology*)
 - ☐ canvass (*field reconnaissance*)
 - ☐ other sources (*local, State, federal agencies*)
- ☐ historical groundwater data
 - ☐ groundwater levels & quality
 - ☐ change in groundwater levels or quality
- ☐ regional hydrogeology
 - ☐ recharge areas
 - ☐ recharge characteristics (*distribution, quality*)
 - ☐ land use in recharge areas
 - ☐ hydraulic continuity between recharge and discharge areas
- ☐ discharge areas
- ☐ aquifer geometry & characteristics
 - ☐ transmissivity & storativity
 - ☐ subsidence

6. Surface water

- ☐ water rights & diversions
- ☐ surface water flow
- ☐ storage facilities
- ☐ deliveries to water districts
- ☐ conveyance capacity
- ☐ tail water

7. Water demand

- ☐ present
 - ☐ population
 - ☐ land use
 - ☐ unit use—urban & agricultural
 - ☐ water demand
 - ☐ water use efficiency
- ☐ projected
 - ☐ assumptions
 - ☐ land use
 - ☐ unit use
 - ☐ population

- ☐ water demand
- ☐ water use efficiency

8. Existing surface water delivery, drainage, and sewage systems

- ☐ locations
- ☐ capacities

9. Water quality

- ☐ surface water
- ☐ groundwater
 - ☐ land use zoning
- ☐ sources of contamination
 - ☐ non-point sources (*fertilizer, sewer leakage, other*)
 - ☐ point sources (*industrial, sewage treatment plants, mining, other*)
- ☐ legal issues
- ☐ source area protection programs

10. Recycled water

- ☐ sources
 - ☐ amount (*quantity*)
 - ☐ quality
 - ☐ wheeling capability
- ☐ regulatory
 - ☐ State Water Resources Control Board
 - ☐ Department of Health Services
 - ☐ county environmental health departments
 - ☐ city/county ordinances
- ☐ treatment
 - ☐ primary, secondary, tertiary
 - ☐ reverse osmosis
- ☐ brine disposal
 - ☐ location
 - ☐ regulation
 - ☐ cost
- ☐ facilities
 - ☐ treatment plants & pipelines
 - ☐ storage (*surface or groundwater recharge—location, capacity*)
- ☐ potential uses
 - ☐ costs
 - ☐ groundwater recharge
 - ☐ landscape irrigation
 - ☐ industrial, agricultural, recreation
 - ☐ fire fighting
 - ☐ construction

- ☐ dual plumbing systems (*toilets in high-rise buildings; cooling plants*)

11. Environmental impacts

- ☐ enhancement
 - ☐ stream flow augmentation & quality
 - ☐ habitat restoration
 - ☐ aesthetics
 - ☐ archeology
- ☐ damage
 - ☐ causes
 - ☐ extent
 - ☐ mitigation
- ☐ social & economic

12. Economics of water management and conjunctive use

- ☐ benefits
 - ☐ water supplies & demands
 - ☐ environmental value
- ☐ costs
 - ☐ project scale
 - ☐ regional/local comparisons
 - ☐ project timing (*integration with local activities, local project assistance*)
 - ☐ environmental damage
 - ☐ net project benefits
 - ☐ direct and indirect impact (*income, employment*)
- ☐ mitigation of damages

13. Other study issues

- ☐ GIS capability
- ☐ CEQA/NEPA documentation



Phase 3—select a model

A model for a water management plan may take the form of a conceptual model, a spread sheet model, a numerical model, or a computer model. The type of model chosen should be tailored to the amount of data available, the goals of the study, the experience of the agency, and the amount of money that is available. A lot can be learned from developing a simple conceptual model and this is the first step that should be taken. Thought should be given at the beginning of the study to the type of model that best suits the needs and goals of the agency. After initial evaluation of groundwater data and the development of conceptual models, development of computer models can be a useful process in helping increase the

understanding of surface water and groundwater flow in the basin and in helping evaluate data collection programs for effectiveness at assessing the resource. Computer models are not a substitute for critical thinking about the resource.



Phase 4—evaluate model results

Evaluation of model results should take place concurrently with work on other phases as part of a continuous process.



Phase 5—select preferred water management alternatives

- ☐ surface water
- ☐ recycled water
 - ☐ test program to prove the suitability of the recycled water for recharge
- ☐ groundwater
 - ☐ conjunctive uses
 - ☐ recharge (*in channel, offstream spreading basins, injection wells, in lieu*)
 - ☐ identification of recharge sites that are available for a reasonable price
- ☐ test programs
- ☐ stakeholder support



Phase 6—implement the program

Implementation of a water management program that will optimize the amount of water available through more efficient use of all water supplies, including surface water, groundwater and recycled water.

For more information on the checklist or assistance, contact any of the following California Department of Water Resources' offices, or see our Web site at www.dwrwater.ca.gov

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2440 Main Street
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